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GEOLOGICAL SERIES
OF
FIELD MUSEUM OF NATURAL HISTORY

Volume VII | DECEMBER 22, 1950 | No. 10

THE LA PORTE METEORITE

BY

SHARAT KUMAR ROY
CHIEF CURATOR, DEPARTMENT OF GEOLOGY

AND

ROBERT KRISS WYANT
CURATOR, ECONOMIC GEOLOGY

LA PORTE

La Porte, La Porte County, Indiana, United States of America.
Latitude 41° 36′ N., Longitude 86° 43′ W.
Iron, medium-course octahedrite (OM).
Found about 1900.
Total weight before cutting, 14,555 grams (32 pounds).
Catalogue numbers, Me 2271 (end piece); Me 2269 (slice); Me 2343 (slice).

The La Porte meteorite (fig. 59) was brought to William N. Rumely's farm supply store at La Porte, Indiana, by a farmer customer who found it on his farm about 1900. The name of the farmer and the location of his farm are unknown, but as the farm was within trading distance of La Porte, it is thought that the meteorite was found somewhere within a radius of twenty-five miles of that town. The meteorite remained in possession of Mr. Rumely until his death. It was then presented to Field Museum by his estate on March 24, 1937. At that time it was thought that the meteorite might have been transported in some way and that it might be a portion of the Kokomo meteorite. The latter was found in Kokomo, Howard County, Indiana, which is about ninety miles southwest of La Porte and near to the place where the present meteorite was found. The Kokomo meteorite, however, is a nickel-rich ataxite; La Porte is a medium-course octahedrite. So there is no possibility of their being individuals belonging to the same fall.

When received, the meteorite weighed 14,555 grams (32 pounds). It had been drilled in two places, apparently to obtain a sample

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for chemical analysis. The result of this analysis, if any was made, has not been published, nor is it known. Since then, three analyses have been made at the Museum and one end of the meteorite was sawed to procure two slices, weighing 813 and 973 grams each. The

FIG. 59. The La Porte meteorite. The flat base is due to sawing to procure sections. ×¼.

latter slice, which now weighs 779.5 grams, was recut to provide a sample for analysis and a piece weighing 94.5 grams for exchange. The end piece weighs 10,037 grams (22.13 pounds).

CHEMICAL ANALYSES

Three quantitative analyses of this meteorite have been made since 1937 as follows:

I. H. W. NICHOLS, *Analyst* (1937; *Preliminary Analysis*)

Element	*Percentage*
Fe	91.06
Ni	8.02
Co	0.75
Cu	0.007
Si	0.03
P	0.12
S	0.11
Total	100.10

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II. HENRY HERPERS, *Analyst* (1939)

Element	*Percentage*
Fe	92.05
Ni	7.31
Co	0.263
Cu	0.02
P	0.172
S	0.025
C	0.193
Si	0.04
Total	100.07

A. Iron was determined on three samples, and the above percentage is the average of the three.

B. Nickel was determined on two samples, and the above percentage is the average of the two.

C. Microchemical tests indicate the presence of tin and the absence of chromium, chlorine, manganese, and platinum(?).

III. ROBERT K. WYANT, *Analyst* (1949)

Element	*Percentage*
Fe	91.92
Ni	7.29
Co	0.36
Cu	0.01
P	0.13
S	0.10
C	0.15
Si	0.00
Total	99.96
Specific gravity	7.51

A. One sample was used.

B. Microchemical tests indicate the presence of traces of tin and manganese, with chromium, chlorine, and platinum absent.

STRUCTURE AND CONSTITUENTS

The meteorite is a shapeless mass (fig. 59), which indicates that it was broken shortly before reaching the earth and that there was not sufficient time for it to have undergone atmospheric shaping. At one end it is roughly rhomboidal in cross section (fig. 60). The pittings on the sides near this end are large and shallow, the maximum diameter and depth being 55 mm. and 10 mm., respectively. The opposite end is somewhat protruded at one point and the surface adjacent to it is deeply excavated and marked by small pittings

with little or no regularity. Neither the shape nor the pittings provide adequate data to determine the front or the rear of the meteorite.

The crust is thin, averaging barely one-half millimeter in thickness. Its surface is rough, in places shaggy, and scaly from oxida-

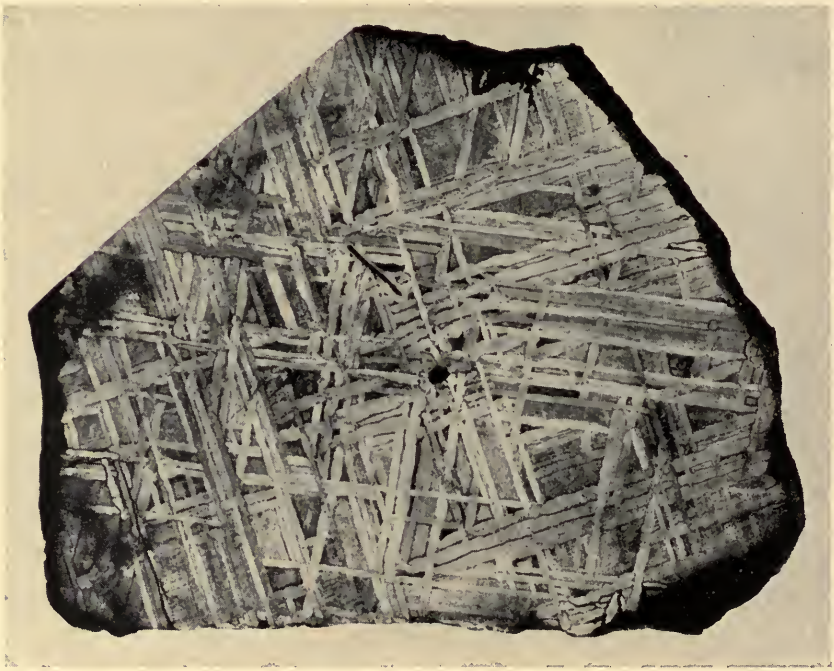

FIG. 60. An etched section of the La Porte meteorite. Some of the bands are parallel to a cubic face, others follow the line of an octahedron. ×¾.

tion. It is dark brown in color, with patches of limonite and a few green spots of ferrous chloride.

The zone of alteration is about three-fourths of a millimeter in width and is visible on the unetched polished surface of the end piece. It is indistinct on the etched section, chiefly because the figures have crossed over the altered zone without any marked change.

As has been stated, two slices were cut from the meteorite and both were polished and etched. Roberholdt's method, except for less concentration of acid, was used for etching. Reaction was slow, for nearly twenty minutes were required to bring out the desired effect. The figures observed (figs. 60, 61) show that the meteorite is a medium-course octahedrite, the kamacite bands varying in

FIG. 61. Another etched section. The arrangement of the bands is the same as that seen in figure 60. ×¾.

width between 0.05 and 2 mm. A few exceed 2 mm., which is to be expected in an octahedrite transitory between two classes.

No grain boundaries in the kamacite bands have been observed (fig. 62) but certain markings resembling hatchings are present. These may be scratch marks and some certainly are; others may

FIG. 62. Enlarged kamacite bands showing no grain boundaries. At the center is a troilite nodule. ×7.

be true hatchings. The bands also contain numerous microscopic pustule-like bodies as well as pits, but the nature of these has not been determined. The former may be the result of differential action of the acid; the latter are probably etching pits.

Taenite lamellae bounding the kamacite bands are typical, either straight, wavy, or irregular, and except for a few dark spots enclosed by taenite lamellae, known as "flecking" (fig. 63), no other special feature of the taenite component has been observed.

Both normal and dense plessite fields (figs. 64, 65) are numerous, and there is little deviation from the usual in the character and disposition of either the kamacite or the taenite lamellae in these fields. Taenite lamellae with thickened ends are relatively rare.

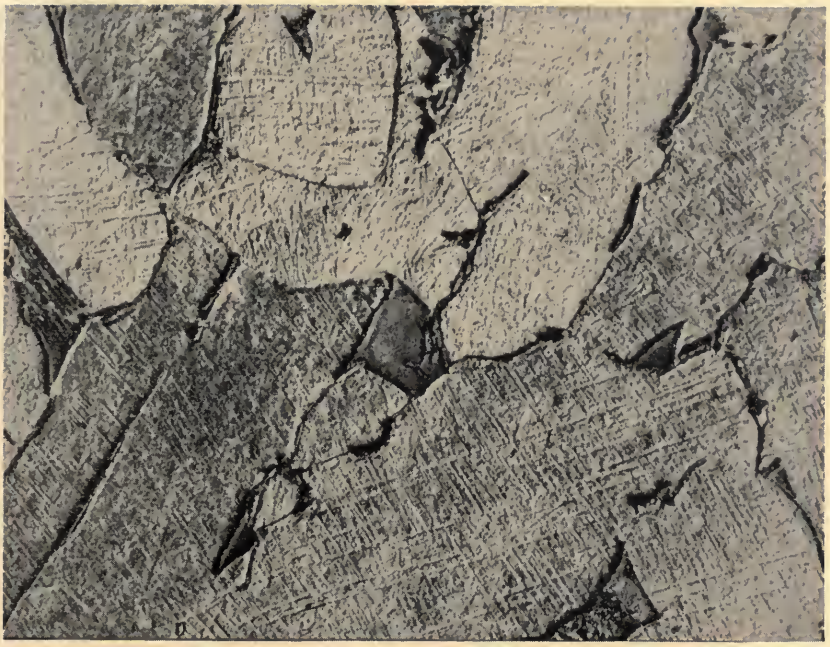

FIG. 63. Enlarged figures showing "flecking" or dark spots enclosed by taenite lamellae. ×10.

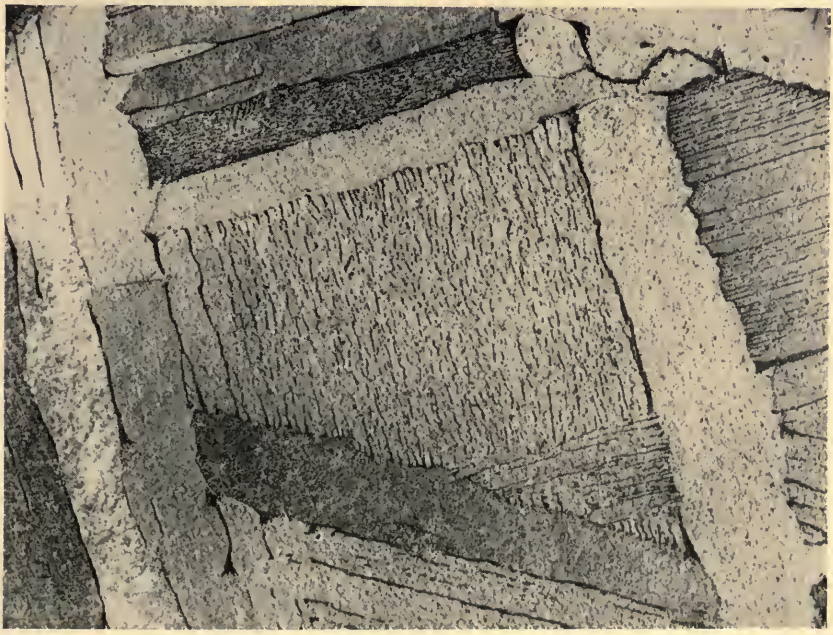

FIG. 64. Enlarged figures. At the center is a typical light plessite field. ×7.

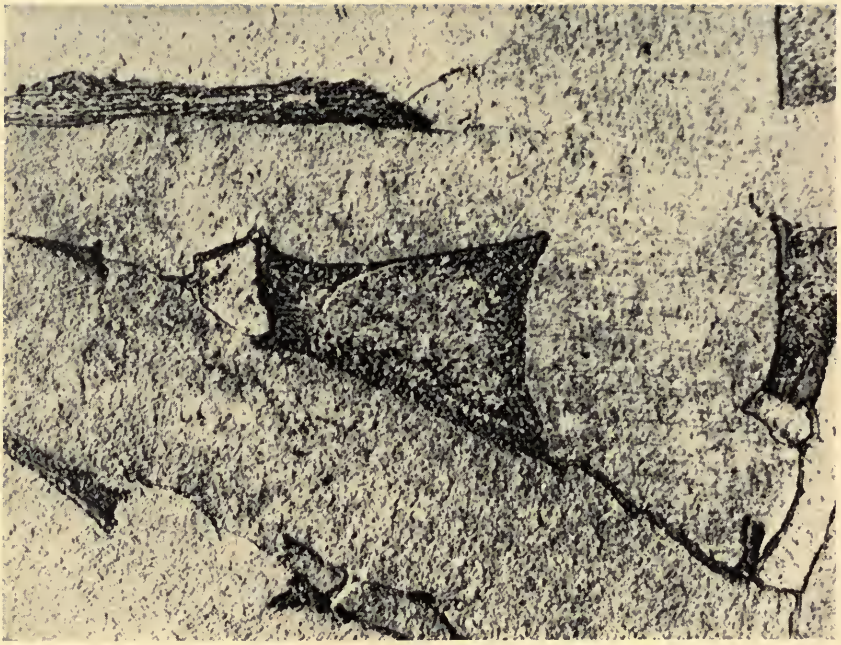

FIG. 65. Typical dark plessite fields. ×15.

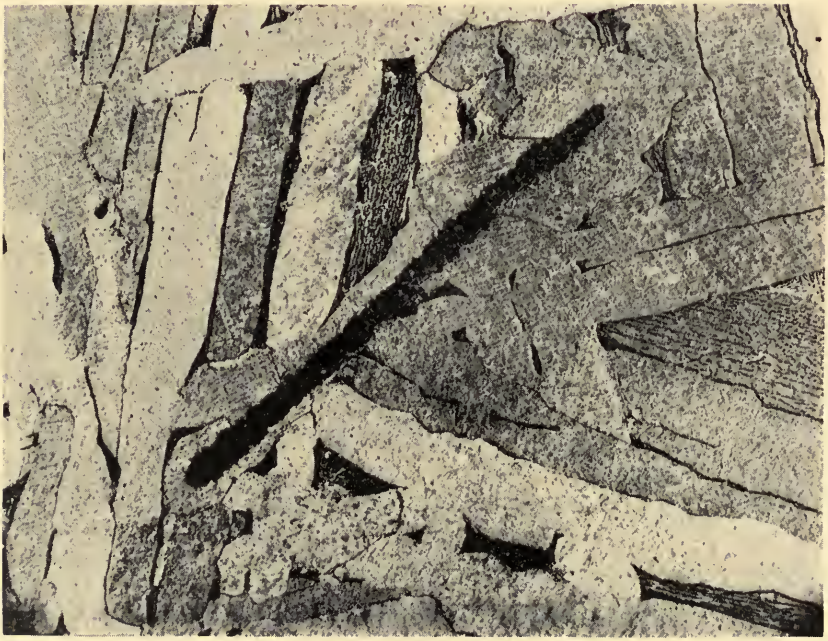

FIG. 66. Enlarged view of an elongated plate-like troilite with serrated edges. ×6.

Most of the fields are four-sided—cubical, rhombic, trapezohedral, or irregularly outlined—and they far outnumber the triangular ones. One reason for this is that the meteorite is cubo-octahedral in structure. Besides possessing octahedral structure, it has bands that run parallel to a cubic face. Modified octahedrites such as

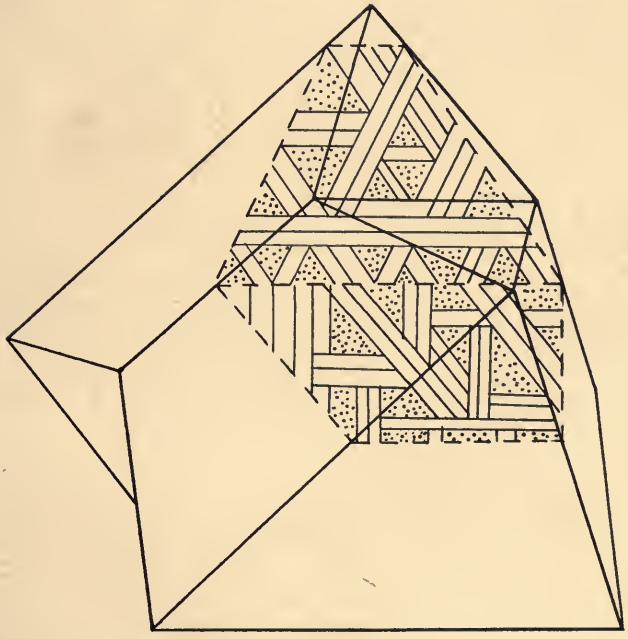

FIG. 67. Diagrammatic perspective illustrating Widmanstätten figures on a section of a spinel twin.

this one have been termed tesseral-octahedrites by Rinne (1910, pp. 115–117). He cites the figures in a section from the Gibeon shower of meteoritic irons (Bethany) as an example. Farrington (1915, p. 95) anglicized the term to tesselated octahedrite. More recently, Spencer (1941, p. 28) proposed the name cubo-octahedrite, which appears to be self-explanatory and more appropriate. This type of structure is thought to result from twinning according to the spinel law. A schematic diagram shown above (fig. 67) may serve to visualize the planes of the structural components. The figure is similar to one shown by Spencer (1941, fig. 7, p. 31) except that the graphic orientation of the spinel twin is changed.

Of the accessory minerals, rhabdites and nodules of troilites are present. Most of the nodules of troilite are visible to the naked eye

and are bounded partly or wholly by swathing kamacite (figs. 60–62). All occur in irregular rounded forms except one, which has an elongated plate-like form with serrated edges (fig. 66), similar to those figured by Rinne (1910, pl. 15, fig. 2). It is about 1.5 mm. in thickness and 13 mm. in length. Since only one such strip has been observed in the two sections examined, it is not possible to say if it has a structural arrangement of its own. It does not, however, follow any of the structural patterns of the figures of the etched section.

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